

## ABSTRACT OF THE DISCLOSURE

Low resistivity, C54-phase  $\text{TiSi}_2$  is formed in narrow lines on heavily doped polysilicon by depositing a bi-layer silicon film. A thin, undoped amorphous layer is deposited on top of a heavily doped layer. The thickness of the undoped amorphous Si is about 2.4 times the thickness of the subsequently deposited Ti film. Upon thermal annealing above  $750^\circ\text{C}$ , the undoped amorphous Si is consumed by the reaction of  $\text{Ti} + \text{Si}$  to form  $\text{TiSi}_2$ , forming a low-resistivity, C54-phase  $\text{TiSi}_2$  film on top of heavily doped polysilicon. The annealing temperature required to form C54 phase  $\text{TiSi}_2$  is reduced by consuming undoped amorphous Si in the reaction of Ti and Si, as compared with heavily doped polysilicon. Narrow lines ( $<0.3\mu\text{m}$ ) of low-resistivity, C54-phase  $\text{TiSi}_2$  films on heavily doped polysilicon are thus achieved.

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